



RESEARCH NOTE LS-37

LAKE STATES FOREST EXPERIMENT STATION • U. S. DEPARTMENT OF AGRICULTURE

A Test of Concentrated Silvicides on Sugar Maple

In a recent test of silvicides by the Lake States Forest Experiment Station in cooperation with the Diamond-National Corporation, 2,4-D amine salts applied in frill girdles produced greater mortality of cull sugar maple trees than did any of the other treatments tested.

A series of unpublished earlier trials, using both esters and amines of 2,4,5-T and 2,4-D, indicated more rapid killing could be obtained with amine salts than with esters. Consequently it was decided to test concentrated amines of these two chemicals applied at full strength (4 pounds acid equivalent per gallon) and diluted 50 percent with water.¹ Two methods of application were employed: (1) sprayed into freshly cut frills made by axe girdling and (2) injected with a tree injector at 1-inch spacings around the root collar. Thus, eight treatments — two chemicals, two concentrations, and two methods of application — were tested. Each treatment was randomly assigned to a group of 10 trees ranging from 7 to 14 inches in diameter at breast height. These treatments were repeated in three separate blocks, making a total of 240 trees in the study.

The study was installed in northern Minnesota on July 24, 1961. The treatments were appraised on June 13, 1962, and a final examination was made on June 21, 1963.

¹ *The two chemicals used in this test, triethylamine salts of 2,4,5-T and alkanolamine (ethanol and isopropanol series) salts of 2,4-D, were supplied through the courtesy of the Dow Chemical Company.*

The results in 1962 showed that 2,4-D had killed a greater proportion of the trees than had 2,4,5-T. A greater proportion of the trees were also three-fourths or more defoliated with 2,4-D than with 2,4,5-T (table 1). An analysis of variance showed both these differences significant at the 5-percent confidence level. These same differences were still significant in 1963, and in addition the application of the chemicals in frills proved more effective than with the tree injector. There was no significant difference between the two concentrations of chemicals used.

Application of the concentrated silvicides into freshly cut frills was facilitated by a pressure oil can. It is possible that the frill girdling itself contributed some to the success of this method. The effects of girdling alone, however, were not tested in this study because of extremely slow results obtained in the past.

The chemicals had the least effect on dominant trees, which averaged only 30 percent dead compared to 49 percent of the codominant, 68 percent of the intermediate, and 75 percent of the suppressed.

During the field examination it was noted that many of the trees classified as living had no live tissue around their stem below where the silvicide was applied. Two possible explanations are: (1) Some trees are able to keep their crowns alive for a considerable length of time with food reserves stored in the root system. (2) The sample trees are scattered throughout a stand of

TABLE 1 — *Success of concentrated silvicides
in defoliating and killing sugar maple*

Chemical	: Appli- : cation :	: Concen- : tration :	: Average : volume : per tree	Condition of tree			
				3/4 defoliated		Dead	
				June 1962	June 1963	June 1962	June 1963
		Percent	C.c.	Percent	Percent	Percent	Percent
2,4-D	Frills	100	28	93	87	30	80
		50	28	73	70	3	57
	Injector	100	28	91	62	25	39
		50	42	92	61	22	54
	Frills	100	28	76	66	7	49
		50	30	67	68	0	52
2,4,5-T	Injector	100	40	68	53	7	37
		50	43	80	47	10	43

untreated trees; if any root grafts should exist between treated and untreated trees the untreated tree might supply the crown of the treated tree, at least while its xylem cells are still functioning.

This might prolong the life of the treated tree even though the chemical was successful. In areas where all trees are treated this condition would not exist.

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